

# APPARATUS FOR FIXING PRINTED CIRCUIT BOARD OF REFRIGERATOR

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The present invention relates to an apparatus for fixing a printed circuit board of a refrigerator, and <sup>more</sup> particularly <sup>to</sup> an apparatus for fixing a printed circuit board of a refrigerator <sup>for fixing a printed circuit board</sup> installed at a <sup>main body of a</sup> refrigerator <sup>main body</sup> so as to control a refrigeration function.

### 2. Description of the Background Art

Lately, as a refrigerator is multifunctionalized, a size and an installation position of a printed circuit board for controlling a refrigeration function is importantly considered.

Figure 1 is a perspective view showing a conventional refrigerator.

As shown therein, at the conventional refrigerator, a fixing apparatus 10 covering a printed circuit board 2 is coupled with an upper portion of the refrigerator main body 1 (or rear surface thereof) by <sup>bolts</sup> a bolt 11. At a lower portion of the refrigerator main body 1, a lower cover 3 is installed.

However, in the conventional refrigerator, the fixing apparatus <sup>10</sup> is installed at the upper portion of the refrigerator main body <sup>1</sup> (or a rear surface), and the printed circuit board <sup>2</sup> is mounted in the fixing apparatus <sup>10</sup>. For this reason, in case of repairing or replacing the printed circuit board, since <sup>bolts 11 have</sup> bolt 11 <sup>has</sup> to be fully unthreaded in order to disassemble the fixing apparatus <sup>10</sup>, it is difficult to repair and replace the board <sup>2</sup>, and it takes much time to <sup>complete the work</sup> terminate those works.

## **SUMMARY OF THE INVENTION**

Therefore, an object of the present invention is to provide an apparatus for  
5 fixing a printed circuit board of a refrigerator capable of being easily and  
conveniently replaced and repaired without moving a refrigerator main body since  
the printed circuit board is slid to be coupled with and separate from the inside of a  
support plate fixed at a lower portion of the refrigerator main body,

To achieve these and other advantages and in accordance with the  
10 purpose of the present invention, as embodied and broadly described herein,  
there is provided an apparatus for fixing a printed circuit board of a refrigerator  
according to the present invention includes a support plate installed at a lower  
portion of a refrigerator main body so as to slidably receive the printed circuit  
board; and a support plate coupling means for fixing the support plate to the lower  
15 portion of the refrigerator main body.

The foregoing and other objects, features, aspects and advantages of the  
present invention will become more apparent from the following detailed  
description of the present invention when taken in conjunction with the  
accompanying drawings.

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## **BRIEF DESCRIPTION OF THE DRAWINGS**

The accompanying drawings, which are included to provide a further  
understanding of the invention and are incorporated in and constitute a unit of this  
25 specification, illustrate embodiments of the invention and together with the

description serve to explain the principles of the invention.

In the drawings:

Figure 1 is a perspective view showing a conventional refrigerator;

Figure 2 is a front view showing installation of an apparatus for fixing a  
5 printed circuit board of a refrigerator according to the present invention;

Figure 3 is a disassembled perspective view showing an apparatus for  
fixing a printed circuit board of a refrigerator according to the present invention;

Figure 4 is an assembled perspective view showing an apparatus for fixing  
a printed circuit board of a refrigerator according to the present invention;

10 Figure 5 is a side view showing an apparatus for fixing a printed circuit  
board of a refrigerator according to the present invention; and

Figure 6 is an enlarged longitudinal sectional view showing a main part.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

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Reference will now be made in detail to the preferred embodiments of the  
present invention, examples of which are illustrated in the accompanying drawings.

Figure 2 is a front view showing installation of an apparatus for fixing a  
printed circuit board of a refrigerator according to the present invention. Figure 3 is  
20 a disassembled perspective view showing an apparatus for fixing a printed circuit  
board of a refrigerator according to the present invention, and Figure 4 is an  
assembled perspective view showing an apparatus for fixing a printed circuit board  
of a refrigerator according to the present invention. Figure 5 is a side view showing  
an apparatus for fixing a printed circuit board of a refrigerator according to the  
25 present invention, and Figure 6 is an enlarged longitudinal sectional view showing

a main part.

As shown therein, an apparatus for fixing a printed circuit board of a refrigerator according to the present invention includes a support plate 110 installed at a lower portion of a refrigerator main body 1 so as to slidably receive the printed circuit board 2; a ~~[bolt]~~<sup>bolt</sup> hole 121 formed at both sides of the support plate in order to fix the support plate 110 to the refrigerator main body; and a ~~[bolt]~~<sup>bolt</sup> 122 coupled to the ~~[bolt]~~<sup>bolt</sup> hole 121.

The support plate 110 includes a receiving portion 111 where the printed circuit board 2 is received; and a flange portion 112 bent and formed at both sides of the receiving portion 111.

Preferably, the support plate 110 is positioned ~~[at]~~<sup>with</sup> an interval of 30mm between itself and a bottom surface S ~~[within]~~<sup>of</sup> the ~~[house]~~<sup>housing</sup> and a surface of the support plate 110 is waterproofed.

At an inner bottom surface of the support plate 110, two guide protrusions 111a are formed in a moving direction of the printed circuit board 2.

The guide ~~[protrusion]~~<sup>protrusions</sup> 111a ~~[can]~~ make ~~[a]~~ movement of the printed circuit board 2 smooth, and, ~~[since generating]~~<sup>because the guide protrusions 111a generate</sup> an interval between the printed circuit board 2 and the inner bottom surface of the support plate 110, ~~[makes]~~<sup>allow</sup> the printed circuit board 2 ~~[received]~~<sup>positioned</sup> in the receiving portion 111 of the support plate 110 ~~[to be]~~<sup>to be</sup> readily and conveniently pulled out.

The printed circuit board 2 is a board where a circuit element for controlling a refrigeration function is integrated. At the back surface of the board, a connection terminal 2a is formed.

At an inner surface of a lower portion of the refrigerator main body 1, a power terminal 1a corresponding to the connection terminal 2a is installed.

Accordingly, if the printed circuit board 2 is inserted into the support plate 110, the connection terminal 2a of the printed circuit board 2 is automatically connected to the power terminal 1a.

At the lower portion of the refrigerator main body 1, a lower cover 3 for covering the support plate 110 is installed. For <sup>aesthetic purposes</sup> [a fine view], the lower cover 3 covers the support plate 110, and makes the support plate 110 invisible in a view of the front of the refrigerator main body 1.

Herein, the lower cover 3 is generally installed at the lower portion of the refrigerator main body 1, and is coupled to the main body 1 [through a bolt] <sup>with a bolt</sup> (not shown).

Generally, at the printed circuit board 2, heat is generated, and thus the support plate 110 is heated by this [generated] heat. Therefore, the front surface of the support plate 110 <sup>which is</sup> [being] in contact with cold air within a <sup>housing</sup> [house], may be covered with [dew] <sup>condensation</sup> and thus the printed circuit board 2 may break down since this [dew] <sup>condensation</sup> can cause a short circuit.

In order to prevent this break down, an adiabatic portion 110a is formed at a portion at which the lower cover 3 and the support plate 110 are in contact with each other, that is, at the front surface of the support plate 110.

In the apparatus for fixing the printed circuit board of the refrigerator according to the present invention constructed as above, a [bolt] <sup>bolt</sup> 122 is coupled at the [hole] <sup>bolt</sup> 121 of the flange 112 of the support plate 110. In this manner, the support plate 110 is fixed to the lower portion of the refrigerator main body 1.

[In a state that assembling] <sup>When the installation</sup> of the support plate 110 [has been terminated], if <sup>is complete</sup> the printed circuit board 2 is inserted into the receiving portion <sup>III</sup> of the support plate 110, the connection terminal 2a is connected to the power terminal 1a.

At this time, the printed circuit board 2 is smoothly inserted into the receiving portion 111 of the support plate 110 by the guide protrusion 111a.

The lower cover 3 is fixed to the lower portion of the refrigerator main body 1 by a ~~volt~~<sup>bolt</sup> (not shown), and prevents the support plate 110 from being exposed to the outside.

When the printed circuit board 2 is replaced because of degradation and a break down thereof, first of all, a ~~volt~~<sup>bolt</sup> (not shown) is unthreaded, and thus the lower cover 3 is separated from the refrigerator main body 1.

Thereafter, if the printed circuit board 2 is pulled out, using a gap between the printed circuit board 2 and the support plate 110, the printed circuit board 2 is separated from the receiving portion 111 of the support plate 110, and simultaneously, the connection terminal 2a is separated from the power terminal 1a.

At this time, the printed circuit board 2 is smoothly separated from the receiving portion 111 of the support plate 110 by the guide protrusion 111a.

As so far described, in the apparatus for fixing the printed circuit board of the refrigerator according to the present invention, without moving a refrigerator main body, the printed circuit ~~is~~<sup>board</sup> ~~slide to be coupled~~<sup>slidably coupled</sup> with or separated from the inside of the support plate fixed at the lower portion of the refrigerator main body. For this reason, the printed circuit board can be replaced more readily and conveniently.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should

be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the metes and bounds of the claims, or equivalence of such metes and bounds are therefore intended to be embraced by the appended claims.